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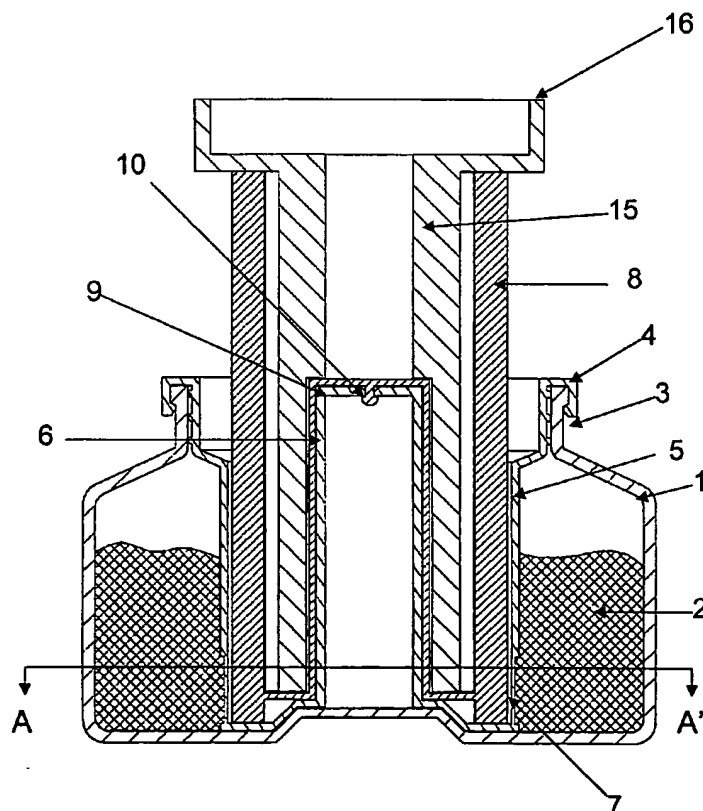
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(54) Title: **VOLATILE LIQUID DISSEMINATING APPARATUS**



(57) Abstract: An apparatus for the dissemination of volatile liquid, such as a fragrance, into an atmosphere comprises a reservoir (1) containing volatile liquid (2) and at least one liquid transfer member (12) that is adapted to transfer liquid from the reservoir to the atmosphere. The transfer member is separated from the liquid, prior to putting the apparatus into operation, by a wall (5) having at least one breakable section (7), there being present at least one breaker element (11) that, when the apparatus is put into operation, is capable of breaking through the breakable section on being urged into contact therewith, thereby exposing the transfer member to the liquid. The transfer member preferably comprises capillary channels.



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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## VOLATILE LIQUID DISSEMINATING APPARATUS

This invention relates to an apparatus for disseminating a volatile liquid into an atmosphere.

5 Many commercially-available apparatus for the dissemination into an atmosphere of volatile liquids, such as fragrances and insecticides, comprise a reservoir of volatile liquid and, extending therefrom, a liquid transfer member, typically a porous wick. In a more recent development, it has been proposed to replace the wick with an external capillary member, that is, a member bearing external channels of capillary dimensions. Such a member has  
10 been described in United States Patent 4,913,350. Such members have the advantage of avoiding the undesirable fractionating effect that occurs particularly with multi-component fragrances, with one component evaporating into the atmosphere before the others. However, apparatus utilising this technology are prone to leakage during transport, and this has been a major factor in the lack of acceptance of this otherwise superior transfer member  
15 technology.

It has now been found that a new design of apparatus can overcome many or even all the problems of the art. The invention therefore provides an apparatus for the dissemination of volatile liquid into an atmosphere, the apparatus comprising a reservoir containing volatile  
20 liquid and at least one liquid transfer member that is adapted to transfer liquid from the reservoir to the atmosphere, the transfer member being separated from the liquid, prior to putting the apparatus into operation, by a wall having at least one breakable section, there being present at least one breaker element that, when the apparatus is put into operation, is capable of breaking through the breakable section on being urged into contact therewith,  
25 thereby exposing the transfer member to the liquid.

The invention additionally provides a method for disseminating controllably from a reservoir into an atmosphere a volatile liquid by providing in the reservoir a transfer member adapted to convey liquid from the reservoir to the atmosphere, the transfer member  
30 being separated from the liquid by a wall in which there is provided at least one breakable section, and causing dissemination when desired by urging a breaker element capable of breaking through the breakable section into breaking contact with that section, thus exposing the transfer member to the liquid.

The apparatus comprises the following essential elements:

- transfer member
- a wall separating the transfer member from the liquid, the wall having therein  
5 at least one breakable section
- at least one breaker element capable of breaking through the breakable section in the wall and exposing the transfer member to the liquid
- means for urging the element through the breakable section.

- 10 The reservoir can be any suitable reservoir of any suitable size and material. It has an orifice through which the transfer member extends to transfer liquid to the atmosphere.

The transfer member can be any suitable transfer member. It may, for example be a porous substance capable of absorbing and transferring liquid, typified by the fibrous and non-  
15 fibrous materials used for making wicks known to the art for the dissemination of such materials as fragrances and insecticides to the atmosphere. However, for the purposes of this invention, capillary channels are the preferred transfer member, and the description of the invention will henceforth be made solely with reference to this embodiment. It should nevertheless be borne in mind that porous materials are useful in this invention and that  
20 their use is not excluded.

Capillary channels are known as means for the transfer of a volatile liquid from a reservoir to an atmosphere, and are described, for example, in United States Patent 4,913,350. They are typically V-shaped channels of dimensions of from 0.1-0.5mm wide at the top, 0.1-  
25 0.5mm deep with the "V" angle of the channel being 10-25 degrees, and they may be provided by any suitable means, such as moulding, engraving or cutting in any suitable material, for example, glass, ceramic, mineral or plastics materials.

The capillary channels extend downwards below the level of the liquid in the reservoir, but  
30 are prevented from making contact with the liquid by a wall. This wall has, at least adjacent to the liquid, at least one breakable portion, for example, a place where the wall is thinner. Although this breakable portion (and the corresponding element that breaks through the breakable portion) is referred to in the singular, the plural is also meant. Indeed, it is

preferable that the wall have a number of such places, typically from 3 to 6. The wall may be any suitable shape, but is preferably cylindrical, with the breakable portion or portions running down the wall parallel to the cylindrical axis.

- 5 The apparatus additionally comprises at least one breaker element adapted to break through the breakable portion when urged to do so. Preferably the number of such elements is equal to that of the breakable portions, and they are arranged such that all elements break through all breakable portions essentially simultaneously. The breaker element may be any suitable element of any suitable material for breaking through the breakable portion, and the skilled  
10 person will readily be able to ascertain what is necessary in each case. Such an element will naturally have an appropriate shape, rigidity and strength relative to the breakable portion to break through the breakable portion.

In a typical arrangement, the breaker element is part of a cylinder that can be rotated, and  
15 rotation (for example, by twisting a cap) will bring it into contact with the breakable portion. The urge to break through may be provided by any suitable means. One way is by means of a ramp (such as a cam profile) placed opposite each breakable portion. Such an apparatus will typically have, in transverse cross-section, the appearance of a number of concentric rings, as outer fixed ring the wall with its breakable portions, as middle rotatable  
20 ring a ring with breaker elements and as inner fixed ring, a ring bearing outwardly-projecting cam profiles, with a cam profile placed opposite each breakable portion. Thus, the rotation of the middle ring will bring the breaker elements against the ramps cam profiles, which will urge them into contact with and then through the breakable portions of the wall to the liquid.

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In an alternative version of the embodiment previously described, the outer and middle rings may be fixed, with the breaker elements positioned opposite the breakable portions, and the inner ring with the cam profiles can rotate, such that it pushes the breaker elements against and through the breakable portions.

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The versions hereinabove described are not in any way limiting on the scope of the invention and the skilled person will readily be able to realise many other apparatus that lie within the scope of the invention, by the application of ordinary skill in the art.

The apparatus is so configured that this breaking of the breakable portions will bring the volatile liquid into contact with the capillary channels. This may be achieved by any convenient placing of the capillary channels with respect to the breakable portions, but in an especially preferred embodiment, the channels are incorporated in the breaker elements themselves. In one variant, the breaker elements have the form of elongate, vertically-orientated (with respect to the apparatus in use) members having a U-shaped cross-section, the U facing outwards towards the breakable portions and the bottom of the U comprising the channels. Preferably, these U-shaped members are sized such that they fit exactly into the breakable portions of the wall. Thus, when they break through the wall, the capillary channels are brought directly into contact with the liquid and the liquid can escape from the reservoir only via the channels. This provides a substantial degree of leakproofness.

There are many variations of this invention that are not described herein, but which fall within the scope of the invention, and the skilled person can readily comprehend these. The invention is further described with reference to a preferred embodiment, which is given only by way of example and is not limiting on the scope of the invention in any way. This embodiment is described in the drawings.

Figure 1 is a longitudinal cross-section through a preferred embodiment of the invention.

Figure 2 is a simplified transverse cross-section through the mechanism of the embodiment along the line AA'.

Figure 3 is an enlargement of a portion of the embodiment of Figure 1.

Figure 4 is a version of Figure 2, showing the actuation of the embodiment of Figures 1-3.

In the Figures, a reservoir 1 contains a volatile liquid 2. The reservoir has the form of a bottle with a neck 3. Fitting into the neck and fixed to it is an insert 4, which extends downwards from the neck to the bottom of the reservoir in the form of a cylindrical wall 5. The wall 5 is closed at the bottom, and extending upwardly from this closure is a coaxial cylindrical re-entrant portion 6. This insert is liquid-tight and therefore defines within the

reservoir a proportion of the volume of the reservoir having no liquid. At the base of the wall 5 and spaced equidistantly around it are four portions 7, which are relatively thin and capable of being broken through, to allow access of the liquid to the interior of the re-entrant portion 6. (It should be noted that, for the sake of simplicity, the re-entrant portions 6 and 9 below are not depicted on Figures 2-4).

Within the insert 4 there is firmly mounted a capillary-bearing member. This has basically the form of a cylindrical wall 8, which wall is closed at the bottom and has formed at this bottom a re-entrant portion 9 that matches in shape the re-entrant portion 6 of the wall 5 and is secured to it by means of a stud 10, such that the capillary-bearing member cannot move. The cylindrical wall 8 and the re-entrant portion 9 are made in a single piece of resilient plastics material.

Spaced equidistantly around the wall 8 and integral with it are four breaker elements 11 bearing capillary channels 12. These breaker elements and their associated capillary channels extend the entire length of the wall, and are attached to thereto by thinner connecting portions of the wall 13, capillary units and capillary bearing units being positioned against the four breakable portions 7 of the insert wall 5 and configured so that, in place, the breaker elements 11 are forced away from the breakable portions 7 against the resilience of the connecting portions 13. The breaker elements 11 additionally bear a projection 14, which assists in breaking through the breakable portions 7.

Lying concentrically within the cylindrical wall 8 is a further essentially cylindrical member 15. This is internally shaped so as to correspond to the shape of the re-entrant portion 9 and to be rotatable thereon, by means of turning a top 16. On its surface, it bears four equidistantly-spaced cams 17 that, on turning the top 16, will be brought simultaneously into contact with the breakable portions 7.

In operation (as is shown in Figure 4), the rotation of the cylindrical member 15 causes the cams 17 to move to the breaker elements 11. These cams force the breaker elements 11 through the breakable wall portions 7, thus allowing liquid to flow through to the interior of the insert 4 and to the capillary channels 12, by which the liquid is transported to the atmosphere.

## Claims:

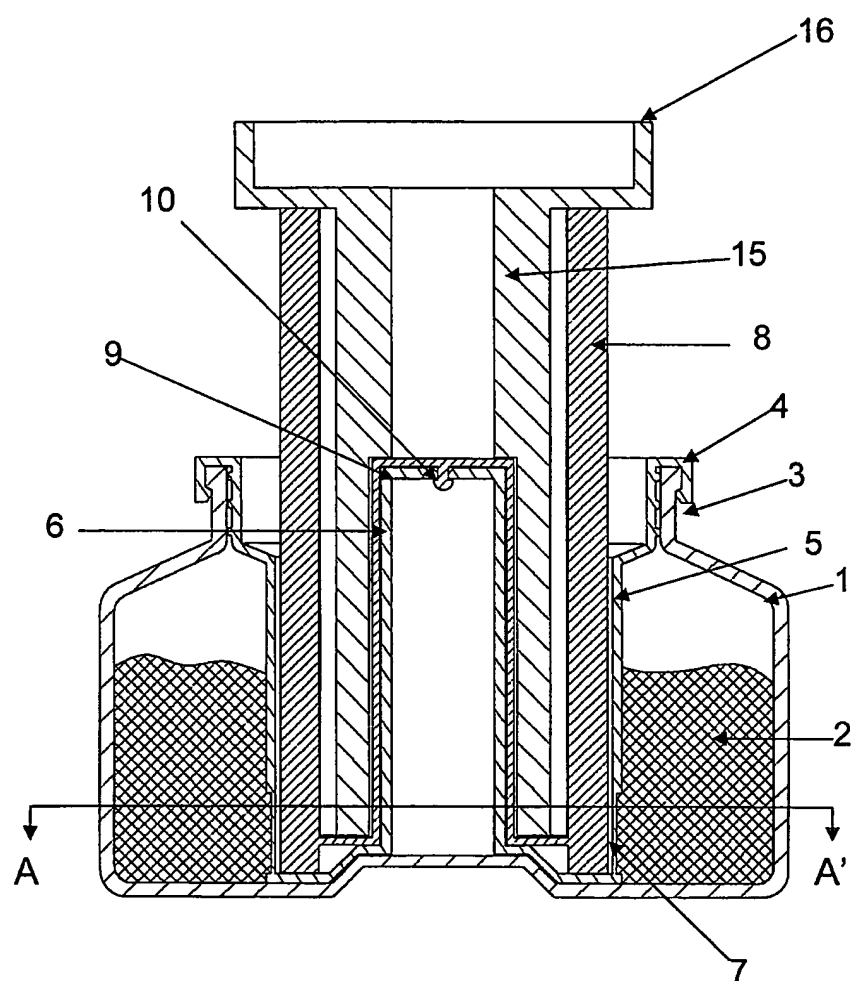
1. An apparatus for the dissemination of volatile liquid into an atmosphere, the apparatus comprising a reservoir (1) containing volatile liquid (2) and at least one liquid transfer member (12) that is adapted to transfer liquid from the reservoir to the atmosphere, the transfer member being separated from the liquid, prior to putting the apparatus into operation, by a wall (5) having at least one breakable section (7), there being present at least one breaker element (11) that, when the apparatus is put into operation, is capable of breaking through the breakable section on being urged into contact therewith, thereby exposing the transfer member to the liquid.
2. An apparatus according to claim 1, in which the transfer member comprises capillary channels.
3. An apparatus according to claim 2, in which the capillary channels are incorporated in the breaker element.
4. An apparatus according to claim 1 or claim 2, in which the breaking of the breakable section by the breaker element is performed by rotation of part of the apparatus.
5. An apparatus according to claim 4, in which that part of the apparatus bearing the breaker element is rotatable with respect to the breakable section and there is positioned opposite the breakable section a stationary ramp adapted to urge the breaker element into breaking contact with the breakable section when the breaker element is rotated.
6. An apparatus according to claim 4, in which that part of the apparatus bearing the breaker element is stationary and is mounted in close proximity to the breakable section, the apparatus additionally comprising a rotatable member bearing a ramp adapted to urge the breaker element against and through the breakable section when the rotatable member is rotated.



7. A method for disseminating controllably from a reservoir into an atmosphere a volatile liquid by providing in the reservoir a transfer member adapted to convey liquid from the reservoir to the atmosphere, the transfer member being separated from the liquid by a wall in which there is provided at least one breakable section, and causing dissemination when desired by urging a breaker element capable of breaking through the breakable section into breaking contact with that section, thus exposing the transfer member to the liquid.
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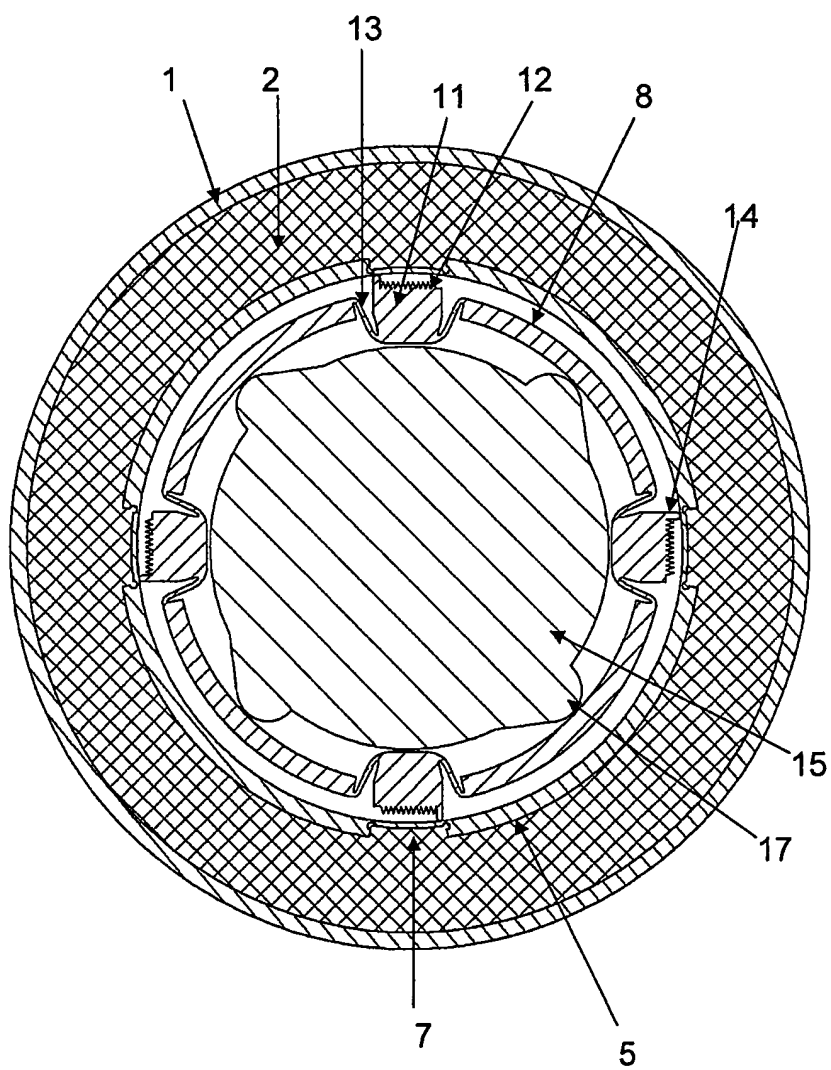
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Fig.1



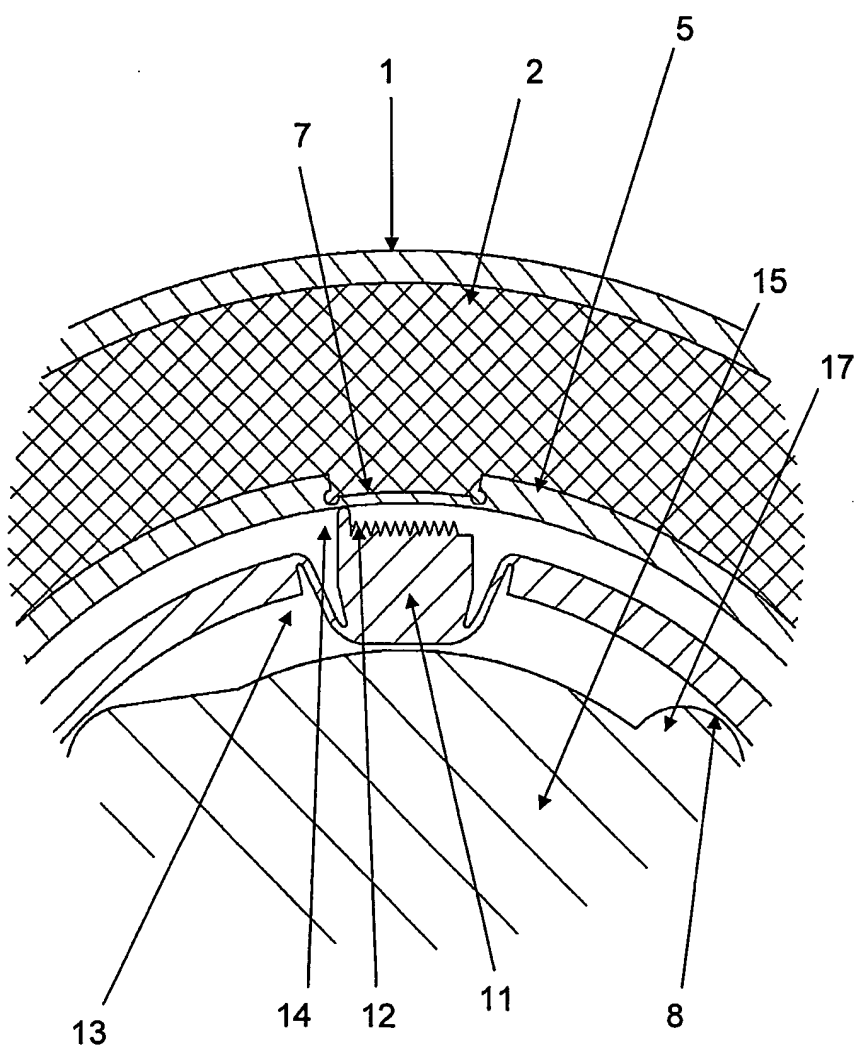
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Fig.2



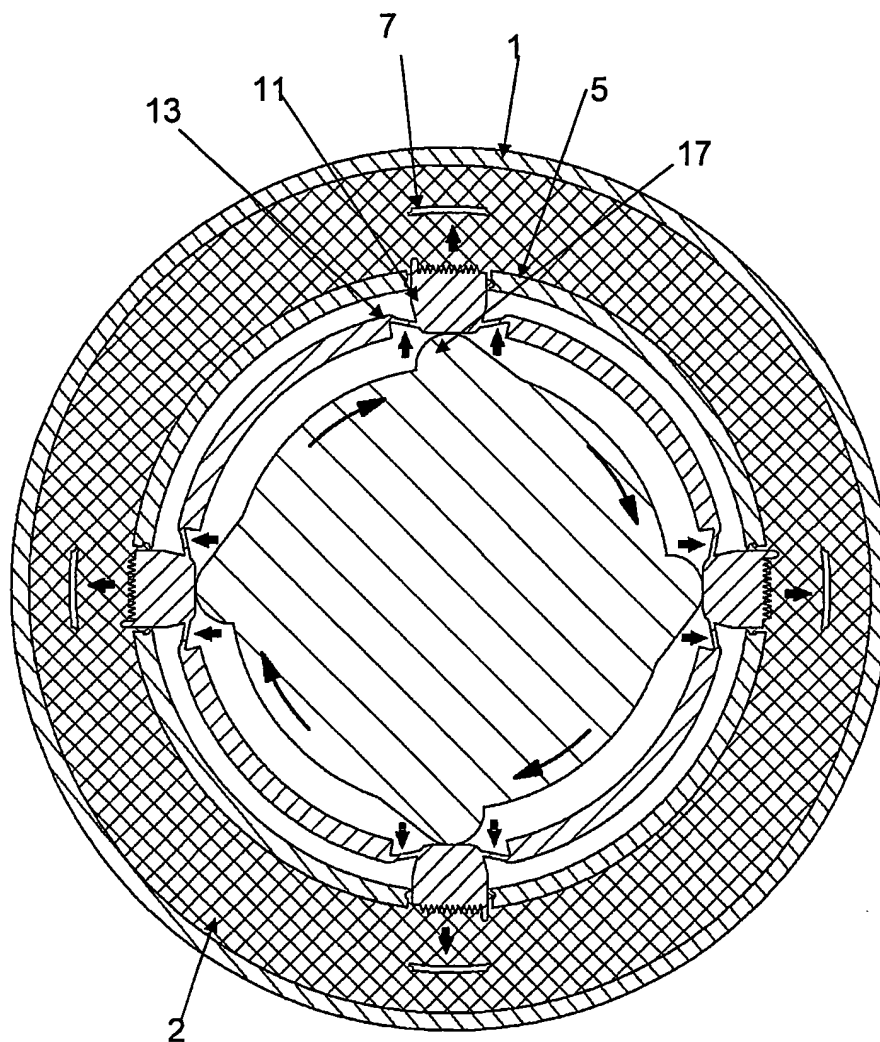
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Fig. 3



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Fig. 4



## INTERNATIONAL SEARCH REPORT

International Application No

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<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7 A61L9/12 A01M1/20		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC 7 A61L A01M		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, WPI Data, PAJ		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 161 217 A (AIRWICK AG) 13 November 1985 (1985-11-13) page 3 - page 4; figures 4,5,9	1,4,5,7
X	WO 01/23008 A (GIVAUDAN SA ; GOHIL KISHEN (GB); HART GERALD LESLIE (GB); NAISH GUY ED) 5 April 2001 (2001-04-05) page 4, line 22 - page 5, line 27; figures 6a,6b	1-3,7
P,X	WO 03/092750 A (GIVAUDAN SA ; BROWN COLIN (GB); NAISH GUY EDWARD (GB); MCGEE THOMAS (U) 13 November 2003 (2003-11-13) page 5, line 22 - page 6, line 15; figures 1,2  ----- -/-	1-3,7
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
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Date of the actual completion of the international search		Date of mailing of the international search report
15 October 2004		25/10/2004
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016		Authorized officer  Marti, P

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/CH2004/000528

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 995 555 A (WOODRUFF KEITH F) 26 February 1991 (1991-02-26) column 4, line 39 - column 5, line 31 column 7, line 60 - column 8, line 5; figures 3,4,6B	1-3,7
X	FR 2 016 795 A (GEIGY AG J R) 15 May 1970 (1970-05-15) page 11, line 27 - page 14, line 6; figure 6	1-3,7
X	US 4 768 676 A (KANEKO TOSHIHIKO) 6 September 1988 (1988-09-06) the whole document	1,7
X	WO 91/13637 A (JOHNSON & SON INC S C) 19 September 1991 (1991-09-19) the whole document	1,7

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/CH2004/000528

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0161217	A	13-11-1985	AU 577853 B2	06-10-1988
			AU 4227085 A	14-11-1985
			BR 8502241 A	14-01-1986
			CA 1246986 A1	20-12-1988
			DK 208685 A	12-11-1985
			EP 0161217 A2	13-11-1985
			ES 279748 U	01-01-1985
			FI 851803 A	12-11-1985
			NO 851881 A ,B,	12-11-1985
			NZ 212037 A	08-10-1986
			PT 80428 A ,B	01-06-1985
			US 4630775 A	23-12-1986
			ZA 8503541 A	24-12-1985
WO 0123008	A	05-04-2001	EP 1088562 A1	04-04-2001
			AT 242014 T	15-06-2003
			AU 748785 B2	13-06-2002
			AU 5355500 A	05-04-2001
			AU 6699000 A	30-04-2001
			BR 0004489 A	19-06-2001
			CA 2321352 A1	29-03-2001
			CA 2339777 A1	02-09-2002
			DE 60003134 D1	10-07-2003
			DE 60003134 T2	08-04-2004
			WO 0123008 A1	05-04-2001
			EP 1088561 A1	04-04-2001
			EP 1133323 A1	19-09-2001
			JP 2001162156 A	19-06-2001
			JP 2003510133 T	18-03-2003
			SG 87165 A1	19-03-2002
			US 2004164181 A1	26-08-2004
			US 6708897 B1	23-03-2004
WO 03092750	A	13-11-2003	WO 03092750 A1	13-11-2003
US 4995555	A	26-02-1991	NONE	
FR 2016795	A	15-05-1970	BE 735839 A	09-01-1970
			DE 1935104 A1	23-04-1970
			ES 369340 A1	01-06-1971
			FR 2016795 A5	15-05-1970
			LU 59067 A1	14-07-1971
			NL 6910647 A	13-01-1970
US 4768676	A	06-09-1988	JP 5032125 Y2	18-08-1993
			JP 63180047 U	21-11-1988
			JP 63094174 U	17-06-1988
WO 9113637	A	19-09-1991	US 5000383 A	19-03-1991
			EP 0518984 A1	23-12-1992
			JP 5505165 T	05-08-1993
			WO 9113637 A1	19-09-1991